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IT Consumerization – A Theory and Practice Review

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ABSTRACT

Consumerization of IT refers to privately-owned IT resources, such as devices or software that are used for business purposes. The effects of consumerization are considered to be a major driver that redefines the relationship between employees (in terms of consumers of enterprise IT) and the IT organization. While there has been extensive debate on these matters in practice, IS research has not developed a clear theoretical understanding of the phenomenon. We present a theory and practice review, where the existing literature on consumerization is reviewed and a clear definition of the concept is developed. This study contributes to a theoretical understanding of IT consumerization in relation to fundamental aspects of IS. Our analysis shows, first, which distinct aspects of IS are affected by consumerization. Secondly, we provide an overview over major advantages and disadvantages for employees and organizations by conducting a systematic analysis of current literature available on the topic.

Keywords

Consumerization, Consumer IT, Information Systems, Theory review

INTRODUCTION

Consumerization of information technology (IT) refers to privately-owned IT resources, such as devices or software that are used for business purposes. Although the general idea of consumerization has been discussed for many years (e.g., Gartner Inc., 2005; Moschella, Neal, Opperman, and Taylor, 2004), it has been only recently that renowned market research institutes picked up the topic and carried out numerous quantitative studies. This shows that, especially in practice, the topic is regarded as highly relevant. Gartner currently sees consumerization between five to ten years before mainstream adoption and clearly states that the trend "cannot be stopped" (Fenn and LeHong, 2011, p. 61).

Consumerization is considered to be a major driver that redefines the relationship between employees (in terms of consumers of enterprise IT) and the IT organization. While existing IT infrastructure often leads to frustrations among employees towards corporate IT (Moschella et al., 2004), consumer IT is showing everybody how enjoying and efficiently IT can be designed. This 'consumerization catch-22' (D'Arcy, 2011) is one of the reasons why "consumerization will present one of the biggest tests […] for business and IT executives within the next five years" (Harris, Ives, and Junglas, 2011, p. 10). The influence of consumerization on productivity is heavily discussed in literature. Consumerization is seen as enabler for the next wave of productivity but also associated with the necessity of enterprise IT and process change (Moore, 2011).

Consumerization has different dimensions and elements. In practice literature, it is common to associate consumerization with devices and software applications (Harris et al., 2011). However, it is not only hard- and software that is affected, but also the way of working. The increasing number of knowledge workers (Logan, Austin and Morello, 2004) in combination with a more tech-savvy staff changes the requirements regarding information systems (IS). Some studies indicate differences how the effects of IT consumerization affect distinct generation of workers, raising the question whether a gap exists between "digital natives" and older workers (Dell and Intel, 2011b). However, this is only one aspect that needs to be taken into account when rethinking organizational policies with regard to consumerization. While there has been an extensive debate on these matters in practice, IS research has neither developed a clear theoretical understanding of the phenomenon nor undertaken efforts to analyze the advantages or disadvantages of it by means of a rigor research process.

Against this background, this paper seeks to make a contribution towards a well-grounded theoretical perspective and gives answers to the following research questions:

- RQ1: What areas of information systems are specifically affected by consumerization?
- RQ2: What are advantages and disadvantages of consumerization from both the employee's and the organizations' point of view?

The remainder of this paper is structured as follows. Section two presents a theory review, where the existing literature on consumerization is reviewed and a clear definition of the concept is developed. After describing our research approach (Section three), the results of our analysis are presented (Section four). The discussion of the paper's limitations and implications for science and practice is followed by a short research outlook in Section five.

THEORY REVIEW

The traditional direction of technology diffusion from enterprises into private households is increasingly changing to a more consumer-driven one. This shift from top-down innovation in IT to a bottom-up approach has been recognized in early research on the topic and is seen as a constituting element of consumerization. In this context, Andriole (2012) states that "[…] there's a reverse technology-adoption life cycle at work: employees bring experience with consumer technologies to the workplace and pressure their companies to adopt new technologies". Today, employees are more aware of the portfolio of devices available and expect to be able to pick and choose the software and devices that best suit their work. They no longer accept being forced by their IT department to adopt a certain solution (Dell and Intel, 2011a).

However, there is no clear definition of what is meant by the term 'consumerization'. It was coined within a position paper by Moschella et al. (2004) recognizing that consumer IT had been increasingly used in an enterprise context. Here, 'dual-use' was seen as defining aspect meaning that "increasingly, hardware devices, network infrastructure and value-added services will be used by both businesses and consumers" (Moschella et al., 2004, p. 2). Thus, in this early definition of the concept, the blurring of business and personal boundaries is considered the key element. While this trend is also recognized by more recent studies (e.g. Gens, Levitas and Segal, 2011), it is widely acknowledged that consumerization should focus on one direction of it, i.e. the use of consumer technologies in a work context. For instance Murdoch et al. see consumerization as „abandoning enterprise IT – both hardware and software – in favor of consumer technologies that promise greater freedom and more fun" (Murdoch, Harris and Devore, 2010, p. 2) whereas Harris et al. define it as "the adoption of consumer applications, tools and devices in the workplace" (Harris et al., 2011, p. 2).

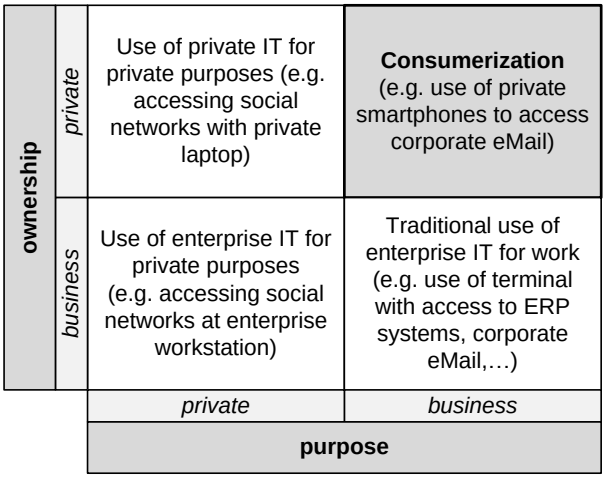

Figure 1: Conceptualizing IT Consumerization

Thus, while there is a common understanding regarding the direction of technology adoption covered by consumerization, most definitions are based on the concept of consumer technologies which is fuzzy and hard to grasp. This is why several authors use ownership of the related devices and applications as distinguishing criterion (e.g. Deloitte, 2011; Harris and Junglas, 2011). For instance, one study relates consumerization to a scenario where workers invest "[…] their own resources to buy, learn, and use a broad range of popular consumer technologies and application tools" in a work context. For the

purpose of this paper, we adopt this perspective and see consumerization as being concerned with privately-owned IT resources that are used for business purposes. This understanding is visualized in Figure 1, which relates the topic to the dimensions ownership and purpose. This narrow focus potentially allows for a clearer analysis of threads and benefits with regards to both the individual and the enterprise perspective. While it may become problematic if employees do not have the discipline to avoid wasting time surfing the web or checking private E-Mail and social media accounts (Davenport, 2011), this – in our understanding – is a different perspective on the subject and, thus, will be neglected for the purpose of this study.

Overlooking the few publications on the topic, we make out that little scientific research has yet been conducted in this area. Most studies on the topic were executed by consulting firms and offer mostly descriptions of the phenomenon as well as normative advice for executives. At this point in time, a theoretical perspective on IT consumerization is yet missing. This has also been found by Sawyer and Winter (2011) who pointed out that the reach of information and communications technology (ICT) nowadays extends far beyond that of previous large organizational centered systems and that the IS scholarly community has not yet adapted to this transformation. They stated that "[…] the 'consumerization' of ICT is growing at the very same time that the IS field is struggling" (Sawyer and Winter, 2011, p. 96). The same issue was recently raised by Baskerville (2011) who pointed out the need to address individual information systems within IS research.

RESEARCH APPROACH

In order to address RQ1, we draw on core IS literature to identify possible areas of IS that could be used to structure our analysis. Here, literature commonly identifies hardware, software, data, people and procedures as major aspects of an information system (Bernus and Schmidt, 2006; Silver, Markus and Beath, 1995; Tatnall, Davey and McConville, 1995). This distinction will be used as analysis groups for the classification of our findings from the literature review. In the context of IT consumerization, we relate the term "hardware" to all kinds of consumer devices entering the workplace. Those devices are for example smartphones, tablets and laptops. All types of applications, including cloud-based ones, are associated with the term "software" (e.g., social networks, Google's web applications, smartphone apps). Under the term "data", we assume all issues that are related to any kind of data handling, for instance data security and data governance. All enterprise actions related to their employees, including trainings and motivational aspects, are summarized under the term "people". Finally, "procedures" classifies all topics of corporate rules and policies as well as processes that were affected by consumerization. Figure 2 visualizes this perspective.

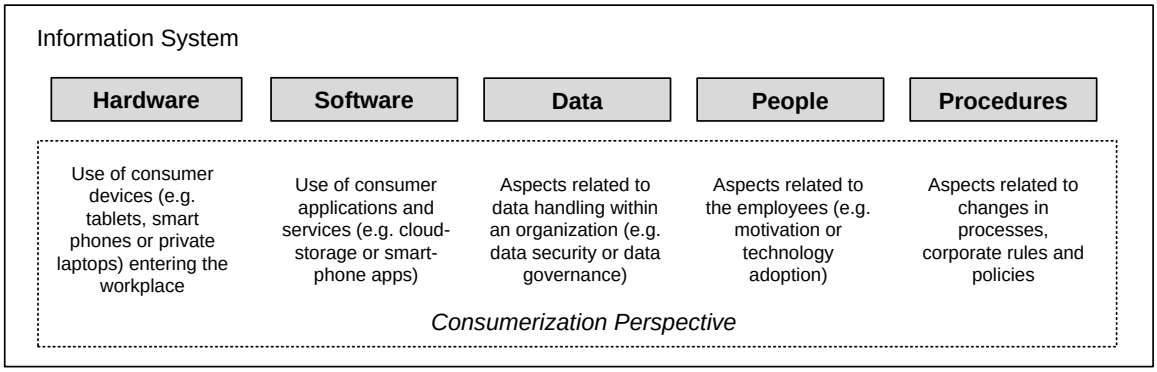

Figure 2: Consumerization Perspective on Areas of an Information System

Research methodology. We conducted a structured literature review as proposed by Webster and Watson (2002). We identified relevant literature using a variety of search terms including "consumerization", "consumerized IT", "bring your own device" and "BYOD". Our search process included a database search (ISI web of knowledge, Google scholar) as well as a forward and backward search starting with the previously identified articles. Due to the fact that consumerization has only recently become a focal point of attention in research, we could not find any publications in IS related journals on the topic. Therefore, we included practitioners' reports, which comprised both qualitative and quantitative studies. Following the divergent search process, we selected a total of 18 studies that – from our perception – would contribute to the research questions. These studies were then coded using several steps. We used iterative open coding (Strauss and Corbin, 1990) to break down the data and to identify major advantages and disadvantages of consumerization mentioned in the studies. This was done independently by the three researchers. From the studies, we derived 114 codes. Afterwards, the results were consolidated and refined in a group effort. From the original codes, we selected 100 suitable ones that were then assigned to one or more fields of the advantage/disadvantage matrix. In a next step, themes that emerged from the different codes were

identified and discussed to come up with a set of categories. Here, selective codes which seemed to have a double meaning were interpreted in group work. In addition to this coding procedure, the codes were also assigned to the previously developed classification scheme in order to address RQ1.

RESULTS

Table 1 shows how the reviewed studies arrange consumerization in the context of IS. An "x" in one cell represents at least one code in the particular area of IS, related to an advantage or disadvantage for employees or organizations. The highest impact can be determined in the area of people and procedures. Furthermore, it is immediately obvious that codes in the data area are primarily associated with negative aspects (e.g., compatibility problems with legacy systems or data security concerns), while codes in the people area are linked with positive consequences (e.g., better employee morale or faster knowledge creation). Mostly, the advantages and disadvantages for people and procedures can be directly linked to those for employees and organizations (see following sections).

Concerning hard- and software aspects, both advantages and disadvantages are mentioned in the studies. For instance, modern mobile devices come preloaded with access to powerful applications and enable employees to work premise-free and more productive. The flip side of the coin is that the variety of devices implies a higher complexity combined with major challenges for IT departments to provide end user service.

IT Consumerization Studies	**Hardware**		**Software**		**Data**		**People**		**Procedures**	
	Adv. (+)	Disa. (-)	Adv. (+)	Disa. (-)	Adv. (+)	Disa. (-)	Adv. (+)	Disa. (-)	Adv. (+)	Disa. (-)
1. Aerospace Industries Association 2011		x				x	x		x	x
2. Avenade 2012							x			x
3. Cisco 2011	x		x			x	x		x	x
4. Compuware 2011				x		x				x
5. D'Arcy 2011	x	x		x		x	x	x	x	x
6. Dell and Intel 2011b			x				x	x		
7. Dell and Intel 2011a	x		x				x		x	
8. Dimensional_Research 2012							x			
9. Dynamic Markets 2011							x		x	
10. Gens et al. 2011	x	x		x			x		x	x
11. Harris, Ives, et al. 2011	x	x	x			x	x		x	
12. Harris, Junglas, and Long 2011	x		x			x	x			x
13. Moschella et al. 2004		x					x	x	x	x
14. Moore 2011										x
15. Murdoch et al. 2010			x		x	x	x			x
16. Prete et al. 2011		x	x			x	x			x
17. PWC 2011						x	x		x	x
18. Unisys 2010							x		x	
Summary	**6**	**6**	**7**	**3**	**1**	**9**	**16**	**5**	**10**	**12**

Table 1: Distinct Aspects of IT Consumerization Addressed by the Studies Analyzed

In the subsequent step, we applied the procedure as described in the methodology sections and iteratively derived 14 code categories from the initial set of codes. The code categories will be described in detail in the following sections.

Advantages for employees

Autonomy (11 codes). Consumerization is generally associated with 'greater freedom' or 'new freedoms' for employees (Dell and Intel, 2011b; Murdoch et al., 2010). This leads to increased autonomy and independence for employees, for instance they may take device and software decisions by their own and can provide technical support for themselves (Harris et al., 2011; PWC, 2011). Chances are that not all employees agree with more autonomy as unrestricted advantage (D'Arcy, 2011), but especially capable workers may enhance their earning potential if provided with a higher degree of autonomy (Dell and Intel, 2011b).

Motivation (9 codes). A lot of studies detected an increase in work satisfaction of employees through the effects of consumerization. According to the study of Dell and Intel (2011b) six out of every ten employees enjoy work more, if they are able to use their own technologies. Enjoyment by technologies plays a role over all age groups, but the effect is strongest among younger workers. The motivation and work satisfaction is supposed to be an important asset for organizations. Hence, this point is obviously related to employee satisfaction as organizational benefit. Indeed, according to Gens et al. (2011) half of the IT organizations name employee satisfaction as primary benefit of consumerization.

Ease of adoption (8 codes). End users perceive their consumer applications and devices as easier to use and more intuitive (Harris et al., 2011; Murdoch et al., 2010). The reason is obviously that the employees are working with their own tools, which they know better and are more used to than to the IT systems provided by their organization. Having a better understanding of the functionalities as well as the look-and-feel of consumer devices and applications, employees are able to adopt changes quicker. Thus, if employers introduce consumer tools into their organizational portfolio, they can expect pre-existing knowledge about the technology among their employees, making the learning process much faster (Prete, Levitas, Grieser, Turner, Pucciarelli and Hudson, 2011). Furthermore, by using consumer tools, end users can solve problems easier (Dell and Intel, 2011) and, thus, more efficient. This indicates that the perceived ease of adoption from a consumer view is strongly related to speed of adoption from an organizational perspective.

Disadvantages for employees

Stress (5 codes). A couple of studies mention the increase of the stress potential for employees. Due to the ubiquity of the workplace employees are "less able to switch off from work" (Dell and Intel, 2011b, p. 8) outside working hours. The private time is not clearly defined anymore and the boundary between private life and working hours becomes blurred. Giving much of their private time to business leads to the perception of stress among employees (Dynamic Markets, 2011), so that firms start to react towards this trend. For instance, Volkswagen famously tackled it by restricting its mobile device access after work hours (BBC News, 2011).

Increase in workload (5 codes). Closely related to employee stress and the blurring of private and work life is the increase in workload for employees. It was found that in the context of consumerization employers benefit from longer work hours of their staff members (Aerospace Industries Association, 2011). However, this is not always a voluntary decision by the employees. Although a considerable part of the workforce appreciates flexible working procedures (Dynamic Markets, 2011), they lead to heavier workloads as well as to pressure to work longer hours, the latter being perceived stronger by younger generations (Dell and Intel, 2011b). Because managers know that their employees are in principle able to work off-hours, they are more likely to give them tasks to work on during these times.

Advantages for organizations

Employee satisfaction (17 codes). Among all positive aspects about consumerization employee satisfaction was most mentioned. Almost all authors assume that employee satisfaction is a major benefit of consumerization for employers. Organizations can address the functional needs of their employees and satisfy them by introducing consumer tools into the company (Dell and Intel, 2011a). Employee morale and productivity will rise, resulting in a better productivity of the workforce. Companies should not underestimate the effect of consumerization on recruiting new staff. To appeal the new generation of tech-savvy workers, companies must be seen as desirable places to work (Dell and Intel, 2011b). Consumerization contributes to that and is already an important factor for job decisions (Cisco, 2011; Unisys, 2010).

Speed of adoption (14 codes). Commonly most of the studies argue that consumerization helps companies to increase the speed of adoption for new technologies. If end users already know a technology from private life, companies do not have to provide training sessions and can immediately start with technology implementation (Murdoch et al., 2010; Unisys, 2010). Furthermore a new generation of tech-savvy employees is able to build up their own solutions with IT tools available at the market (Harris et al., 2011). This quick tool creation by capable employees fosters the company's innovation process and further increases adoption cycles (Aerospace Industries Association, 2011).

Employee availability (10 codes). Enterprises increasingly want to have a workforce, which is flexible enough to be available, when business needs occur. Consumerization already contributed a major piece to establish those just-in-time resources (Dell and Intel, 2011a). In addition, companies benefit from "free" longer work hours of their employees because of the blurring of work and lifetime. By using their own consumer tools employees implicitly accept tradeoffs in terms of work-life balance (Dell and Intel, 2011b) and work more off-hours (Prete et al., 2011).

Customer focus (6 codes). Changes in the way enterprises approach new and existing customers can be seen as a minor factor of consumerization. Similarly to the aforementioned modified ways to recruit new tech-savvy employees, the same thing holds true for attracting tech-savvy customers. Consumer technology and flexibility in working times can help "[…] to appeal to a new generation of customers" (Unisys, 2010, p. 8) and enhance customer communication (Dynamic Markets, 2011).

Employee investments (5 codes). A few studies mention cost benefits through employee investments as another implicit advantage for organizations (e.g. Aerospace Industries Association, 2011). Most of the companies currently do not have an elaborated "Bring Your Own Device" (BYOD) strategy. However, some employees tend to value their personal productivity higher than the guidelines of the company and just buy the desired IT support at their own expense. The general need to cut IT costs brings companies to accept this kind of procedure because despite all resulting drawbacks for the organization, the employee makes a capital investment that benefits the company (Dell and Intel, 2011a).

Disadvantages for organizations

Security issues (21 codes). It is not surprising, that security issues are the most mentioned concern with respect to consumerization of IT. Companies oftentimes struggle to establish effective security guidelines for employee-owned devices and software. The fear to loose company data or make data visible to non-authorized third parties is widespread and it is often justified (Aerospace Industries Association, 2011; Compuware, 2011). Careless employees do not believe that they are responsible for the security of consumer IT and use it inappropriately (Cisco, 2011; Dimensional Research, 2012). Moreover, if end users ignore existing corporate policies, store company data on their private devices or use private cloud service, additional risks will arise. Externally stored company data is difficult to protect and can be an easy target of disastrous attacks (PWC, 2011).

Support complexity (15 codes). Many study authors share the opinion that the consumerization trend will increase the workload of the IT department. It has been found that "more devices, times more apps, equals exponentially more complexity for IT to support and manage" (Gens et al., 2011, p. 4). This calculation can be extended with additional costs for integrating legacy systems (Murdoch et al., 2010) and supporting nonstandard personal devices (Aerospace Industries Association, 2011). It is often hard enough to ensure connectivity of legacy systems and mobile devices to enterprise IT. Manifold consumer applications and software make this task even more difficult and add more complexity.

Loss of process control (12 codes). Consumerization of IT can be seen as another challenge, which doubts the process control of the IT department. Due to the lack of up-to-date policies tackling consumerization, employees have taken the lead and make their own IT decisions (Harris et al., 2011; PWC, 2011). A good example for this are cloud-storage services like Dropbox that – due to their easy handling – are more and more adopted by people in a work environment. However, this not only leads to a knowledge loss for the company if the employee retires or takes a job in another organization but also bypasses existing policies and security guidelines. This is a major issue for executives. On the one hand, CIOs must find a suitable adoption strategy for the consumerization of IT to stay strong and leverage its benefits (Gens et al., 2011; Moore, 2011). On the other hand, the complexity for policies of multi-tool support and data monitoring has significantly increased and needs to be handled.

Performance concerns (8 codes). Consumer applications come along with more computing power in contrast to enterprise IT (Murdoch et al., 2010). However, companies are anxious about the performance of consumer IT. Besides compatibility problems for mobile devices, there are in particular reliability concerns (e.g. Harris et al., 2011). Companies do not always feel comfortable if their applications and data rely on "external networks", for instance in form of cloud providers (Compuware, 2011, p. 1).

Table 2 provides an overview over the advantages and disadvantages of consumerization for both employees and organization as identified in the studies. The number in brackets represents the frequency of appearance within this code category.

	Advantages	Disadvantages
Employee	Autonomy (11) Motivation (9) Ease of adoption (8)	Stress (5) Increase in workload (5)
Organization	Employee satisfaction (17) Speed of adoption (14) Employee availability (10) Customer focus (6) Employee investments (5)	Security issues (21) Support complexity (15) Loss of process control (12) Performance concerns (8)

Table 2: IT Consumerization from the Employee and the Organizational Perspective

DISCUSSION AND CONCLUSION

This study contributes to a theoretical understanding of IT consumerization in relation to fundamental aspects of IS (hardware, software, data, people, and procedures). Our analysis shows, first, which distinct aspects of IS are affected by consumerization. Secondly, we provide an overview over major advantages and disadvantages for employees and organizations by conducting a systematic analysis of current literature available on the topic.

Implications for theory. Our literature search process provides evidence that not much has yet been published on theory development in the area of IT consumerization. While the majority of recently conducted studies widely acknowledge that consumerization is an important trend that will significantly influence organizational processes and policies in the near future, a theoretical understanding is yet to be developed. This research presents a first step to close the gap between IS research and practice (Sawyer and Winter, 2011) in this area. We conceptualized consumerization from an IS scholar's point of view thereby drawing on a variety of definitions from recent studies from practitioners. The presented discussion on differences within these definitions as well as the development of a clear understanding with regard to the dimensions ownership and purpose may be a starting point for future theory development in this area. Furthermore, our research shows that people and procedures are highly affected by consumerization. While this is not surprising because the trend has been triggered by consumers and their individual needs, it shows that IS research in this context needs to have a more interdisciplinary focus. In order to develop a theory perspective on IT consumerization and its implications, it is inevitable to take into account psychological aspects as well. During our coding process, we recognized that some emerging categories resembled those from psychological macro theories like self-determination theory (Ryan and Deci, 2000). Thus, these might be a valid starting point for developing a theoretical perspective on IT consumerization.

Implications for practice. While there is a plethora of studies available for practitioners to read, our analysis provides a potentially valuable differentiated overview over important advantages and disadvantages of particular IT consumerization aspects. The categories that were identified during our coding procedure may enable practitioners to take more informed decisions. While it is likely that, over time, certain disadvantages may turn into advantages or vice-versa, our research may present a good starting point for discussions on the topic. For executives, it is important to closely evaluate advantages and disadvantages with respect to the organizational context to determine whether or not to change IT policies and procedures. Thus, our framework may be used as guideline for IT policy evaluation within an organization by pointing out important aspects to consider by CIOs rethinking the IT strategy of their company.

Limitations and outlook. We have to note that there might exist some advantages and especially disadvantages of consumerization apart from what has been mentioned in the discussed studies. We only analyzed 18 studies, mostly from analysts and consulting firms. Against this background, it could be argued that there might be a positive bias in the data set. Because the firms' primary interest is to promote their market position and sell their solutions, the studies may have a certain focus on positive aspects, i.e. opportunities, rather than issues associated with IT consumerization. Potential drawbacks of consumerization for individuals may be somewhat underestimated within the reviewed studies. As an example, employees have to fear sincere legal consequences, if they violate the corporate policies on purpose by using their own IT. Currently, the procedures are not clearly defined and end users believe that securing their work devices is not within their responsibility (Cisco, 2011). Thus, additional research has to focus on the validation and extension of the categories that have been developed within the coding process of our research. Furthermore, future studies could analyze how certain areas of IS are

influenced by IT consumerization, i.e. identify causal relationships, and apply different theoretical perspectives on the matter to come up with a holistic and thorough understanding of the phenomenon.

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